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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,496	06/30/2003	Yuko Inatomi	116391	8653
25944	7590	01/12/2005		
OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320			EXAMINER VERBITSKY, GAIL KAPLAN	
			ART UNIT 2859	PAPER NUMBER

DATE MAILED: 01/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/608,496

Applicant(s)

INATOMI ET AL.

Examiner

Gail Verbitsky

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 October 2004.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-16 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 10/15/2004.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 1, 8 and 15-16 are objected to because of the following informalities:

A) Perhaps applicant should insert –electrically—before “conductive” in lines 1, 3, 5, 6, 8, 11 of claim 1, and lines 1, 3, 5, 7, 10 of claim 8, in order to clearly describe the invention.

B) Claims 15 and 16: the limitation starting with (where L: ...) makes the claim language confusing because it is not clear if the limitation included in the parenthesis is being positively claimed.

C) Claims 15 and 16: the claimed formula is different from the formula described in the specification, paragraph [0020]. Perhaps applicant should correct the formula in the specification.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-12, 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over SU 1346977/ SU3984301A [hereinafter SU] in view of Wilcox et al. (U.S. 5038996) [hereinafter Wilcox].

SU discloses a device/ apparatus/ method in the field of applicant's endeavor. The method comprises joining an impurity material (solid gold film) to a thin film of a solid silver material having a thickness  $d$  (diffusion length  $L$ ). The two solid materials are placed in a thermostat and subject to heating and applying of a constant magnetic field perpendicular to the surface of the joined films. A coefficient of diffusion is being determined by using a formula  $D=d^2/4t$  or, when modified,  $d=16 (Dt)^{1/2}$ , where  $D$  is a coefficient of diffusion,  $d$ - is thickness (diffusion length  $L$ ),  $t$  is a diffusion time. It is inherent, that there is a means to apply the magnetic field.

SU does not explicitly state that the heating is done to melt the materials. SU does not explicitly state that materials are joined along a gravity direction (vertically) and that the magnetic field is applied perpendicular to the gravity direction (horizontally), as stated in claim 8, with the remaining limitations of claims 8-14 and 16.

Wilcox discloses in Figs. 1-3 a device/ method in the field of applicant's endeavor wherein the materials are melted (eutectic state) and interdiffusion is created between the materials and then cooled (not heated). As shown in Fig. 3, the materials are joined one on top another along the gravity direction (vertically).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method, disclosed by SU, so as to heat the materials up to the melting point/ eutectic state, so as to liquefy the materials and thus, to provide a better bonding between them when they solidify, as very well known in the art.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to join the materials vertically (along the gravity direction), as taught by Wilcox, because the particular direction, absent any criticality, is only considered to be the “preferred” or “optimum” direction that the person having ordinary skill in the art at the time the invention was made would have been able to determine using routine experimentation based, among other things, on the particular type of the diffusion furnace being used.

With respect to claim 9: The particular ratio (height and width) of the materials (conductive melts), absent any criticality, is only considered to be the “optimum” ratio used by SU that a person having ordinary skill in the art at the time the invention was made would have been able to determine using routine experimentation based, among other things, on the type of the conductive materials and the intended use of the device, etc. **See *In re Boesch*, 205 USPQ 215 (CCPA 1980).**

With respect to claims 4 and 11: the use of the particular material, i.e., graphite, as stated in claims 4 and 11, for the vessel, absent any criticality, is only considered to be the “optimum” material that a person having ordinary skill in the art at the time the invention was made using routine experimentation would have found obvious to provide for the probe element disclosed by SU since it has been held to be a matter of obvious design choice and within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use of the invention. **In re Leshin, 125 USPQ 416.**

With respect to claims 5 and 12: the particular strength of the magnetic field, i.e., 1 Tesla and over, absent any criticality, is only considered to be the “optimum” strength of the magnetic field, that a person having ordinary skill in the art at the time the invention

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was made would have been able to determine using routine experimentation based, among other things, on the desired temperature of heating and the particular materials being used. In re Boesch, 205 USPQ 215 (CCPA 1980).

With respect to claims 7 and 14: the particular material for the melt, i.e., In-Sn, as stated in claim 14, absent any criticality, is only considered to be the "optimum" material, that a person having ordinary skill in the art at the time the invention was made would have been able to determine using routine experimentation based, among other things, on the desired resulting melt and its intended use. In re Boesch, 205 USPQ 215 (CCPA 1980).

With respect to claim 6: the particular cooling rate, absent any criticality, is only considered to be the "optimum" cooling rate that the person having ordinary skill in the art at the time the invention was made would have been able to determine using routine experimentation based, among other things, on the type of materials and their solidification time, etc. See in re Boesch, 205 USPQ 215 (CCPA 1980).

6. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over SU and Wilcox applied to claims 1-12, 14, 15-16 above, and further in view of Sato (U.S. 5304972).

SU and Wilcox disclose the device as stated above in paragraph 5.

They do not explicitly state that the magnetic field is a superconductive magnet orthogonal to gravity, as stated in claim 13.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method used by SU and Wilcox, so as to replace the means for applying magnetic field with a superconducting magnet, as taught

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by Sato, because both of them are alternate types of means of applying magnetic field which will perform the same function of applying magnetic field to the materials of interest, if one is replaced with another.

**Conclusion**

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art cited in the PTO-892 and not mentioned above disclose related devices and methods.

Any inquiry concerning this communication should be directed to the Examiner Verbitsky who can be reached at (571) 272-2253 Monday through Friday 8:00 to 4:00 ET.

GKV

Gail Verbitsky

Primary Patent Examiner, TC 2800



December 17, 2004